- if the plan did adjust for changes in the cost of capital, it would have to (i) adjust as well for changes in the prices of labor and raw materials, (ii) adjust because the historical differential between LEC and U.S. input price growths is already incorporated in the X of 3.3 percent, and (iii) adjust to remove the effect of changes in the cost of capital on GNP-PI. It is arithmetically incorrect to treat current LEC prices as if they were set to earn the authorized cost of capital at the start of the plan.

In light of the data, there is no evidence to warrant a decrease in the LEC PCIs or an increase in the productivity offset.

An Update of the Commission's Previous Methodology for Setting X in the LEC Price Cap Plan

In CC Docket No. 87-313, the Commission performed two studies to calculate the historical relationship between telecommunications prices and national inflation. The first, the Spavins-Lande study,[1] measured the long run difference between national inflation--as measured by the CPI-U--and telecommunications prices--as measured by the CPI price index of total telephone services over the 1929-1989 period. The second, the Frentrup-Uretsky study,[2] measured the short run difference between LEC switched access prices (adjusted for exogenous cost changes) and national inflation--as measured by the GNP-PI--over the June 1984 through June 1991 period. The Spavins-Lande result of 1.7 to 2 percent was revised to apply to interstate access and interexchange services and to account for the common line formula in the price cap plan, giving a productivity offset of 2.1 percent.[3] This long run offset was then averaged with the offset from the short run study (3.5 percent) to obtain an offset of 2.8 percent. In recognition of additional productivity growth made possible by the adoption of the price cap plan, the Commission then added a consumer productivity dividend of 0.5 percent to arrive at the productivity target of 3.3 percent.

In this Attachment, these same methods were applied to more recent data to recalculate X. First, the long-term Spavins-Lande study was updated to 1993 and the annual real rate of growth of telephone prices (as measured by the CPI) was found to average 1.6 percent over the 1929-1993 period, as compared with 1.7 for the 1929-1987 period in the Spavins-Lande study. Applying the adjustments (outlined in the Second Report and Order) to account for (i) the differential rates of

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[1]Supplemental Notice of Proposed Rulemaking, CC Docket No. 87-313, (Supplemental Notice) March 12, 1990, Appendix D, and Second Report and Order, CC Docket No. 87-313, (LEC Price Cap Order) October 4, 1990, Appendix D.

[2]Supplemental Notice, Appendix C, and LEC Price Cap Order Appendix C.

[3]LEC Price Cap Order, ¶s 92-95.

growth of interstate and intrastate demand and (ii) the difference between per-line and the Balanced 50-50 NTS formula,[4] the updated long-term productivity offset was unchanged at about 2.1 percent.

To update the Frentrup-Uretsky study, data was used from all Tier-1 LECs for eight post-divestiture periods: June 1984 through May 1985 (1984/85), June 1985 through May 1986 (1985/86), July 1986 through June 1987 (1986/87), calendar year 1988 (1988), calendar year 1989 (1989), calendar year 1990 (1990), calendar year 1991 (1991) and calendar year 1992 (1992).[5] The same techniques were used to calculate post-divestiture productivity offsets as were used in the original Frentrup-Uretsky study. As before, there are two interpretations to the calculation. First--and most directly--the X value calculated is the value required in a hypothetical Balanced 50/50 price cap plan commencing in 1984 that would just reproduce the growth in prices over the period that would have occurred if regulation had kept earnings constant. Alternatively, under the assumption that input price growth is the same for LECs as for the U.S. as a whole, the value calculated is the LEC productivity differential--the difference between LEC total factor productivity growth (for interstate switched access services) and the U.S. total factor productivity growth embodied in the rate of growth of GNP-PI.[6]

Using the Commission's original methodology,[7] historical data were treated as having been generated by seven price cap annual filings: initial rates are the 1984/85 rates and each

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[4]See the LEC Price Cap Order, ¶s 91-95 and Appendix D: Thomas C. Spavins, "The Long Term View of the Appropriate Productivity Factor for Interstate Exchange Access," ¶s 9-11.

[5]In the Frentrup-Uretsky study, only six post-divestiture periods were available. The definition of the first four periods was identical with the current study. The fifth period, 1989, was defined as April 1989 through December 1989 (annualized) in the Frentrup-Uretsky study and as calendar 1989 in the current study. The sixth period used forecast data for the 12 month period July 1990 through June 1991 in the Frentrup-Uretsky study and is taken to be calendar 1990 in the present study. The current study thus differs slightly in data and results when compared for the first six periods with the Frentrup-Uretsky study.

[6]Note that the fact that most LECs were under price cap regulation during part of the period does not affect of use of a price-based measure of the productivity offset. Adjustments to prices were made to keep measured earnings constant in each period, so that changes in adjusted prices properly reflect changes in underlying productivity, rather than merely reflecting the action of the price cap annual adjustment formula.

[7]As described, for example, in the LEC Price Cap Order, ¶s 74-102.

subsequent rate period in the data is produced by an update filing. The process began with the actual 1984/85 rates for CL and switched access. For any given value of the productivity offset X, the actual changes in GNP-PI and CL growth were used to adjust the 1984/85 rates using the FCC's Balanced 50/50 formula to determine the 1985/86 rates. This process was conducted a total of seven times until 1992 rates were obtained. The value of the X-factor was then calculated which would just produce the actual rate in the final (1992) period.

CL rates, TS rates and total switched access rates were computed as average revenue per minute of use where revenue was adjusted for exogenous changes--as used in the Frentrup-Uretsky study and accepted by the FCC--that would have been reflected in the CL and TS price cap indices. In keeping with the methodology employed in the Frentrup-Uretsky study, a number of additional adjustments to revenue were made. CL and TS revenue were recast to earn 11.25 percent, the currently authorized rate of return. The revenue requirements for inside wire (IW) and customer premise equipment (CPE) were removed. Equal Access conversion and Universal Service Fund (high cost fund) costs were also removed. Changes to NTS revenue requirements were adjusted to account for the removal of inside wire and CPE, evaluated at earnings of 11.25 percent.

Some revenue adjustments (e.g., exogenous changes, changes in the subscriber line charge, or inside wire revenue requirement) altered the actual rate charged during the period and thus brought about a demand stimulation effect. As was done in the original Frentrup-Uretsky study, adjustments were made for the effects of demand stimulation from a 1984/85 base.[8] A unitary X was then calculated, using historical values of the required parameters and following exactly the method used by Frentrup-Uretsky. The resulting historical unitary X is the single productivity offset that--if used in the Balanced 50/50 formula--would just reproduce the price growth actually experienced over

[8]In the prior Frentrup-Uretsky (and NERA) studies, estimates of the TS stimulated minutes of use were calculated to account for the NTS component (the costs associated with line termination at the switch) of the TS category. In the current study the same type of adjustment is made to TS adjusted revenues. The fact that revenue requirements increase less than proportionally with TS demand is accounted for by increasing TS revenue by the product of proportional demand stimulation and the ratio of NTS line termination revenue requirements to total TS revenue requirements.

Table 1
Productivity Offsets for Tier-1 LECs

	1984- 1992 Period	1984 - 1990 Period
CL	2.98%	3.52%
TS	3.41%	5.25%
Unitary	2.66%	3.38%
g =	6.19%	6.45%
GNP-PI =	4.06%	4.05%
% SLC =	65.71%	61.94%

the 1984-1992 period. In the Frentrup-Uretsky study for the 1984/85 - 1991 period, the historical unitary X was 3.49 percent.[9]

For all Tier-1 LECs measured over the entire updated period, the historical unitary X is 2.7 percent which is 0.8 percentage points below the Frentrup-Uretsky previous historical result. If the analysis were confined to the first six periods--the ones used in the original Frentrup-Uretsky study--the historical unitary X would be 3.4 percent, which would be 0.1 percentage points below the Frentrup-Uretsky unitary X of 3.50 percent for roughly the same period. The components of these calculations are shown in Table 1. The difference in the results over similar periods is caused by the use of slightly different data: the Frentrup-Uretsky fifth and sixth periods were annualized data from parts of a year and from forecasted data. For example, actual minutes for the sixth period were about 5 percent below the forecasts used by Frentrup-Uretsky. For the first six periods, the unitary X is somewhat below its value for the longer interval including the price cap period,

[9]Frentrup-Uretsky also calculated a "prospective" unitary X, using assumed values for growth in usage, growth in lines, and the percentage of CL revenue recovered by SLCs, obtaining a slightly lower-than-historical value of 3.43 percent.

suggesting that some event slowed the real rate of decline of carrier access prices in the last two periods.

The average of the updated short-term (Frentrup-Uretsky) unitary X of 2.7 and the updated long-term (Spavins-Lande) productivity offset of 2.1 is thus 2.4 percent. In CC Docket No. 87-313, the Commission set the productivity offset X by averaging the Frentrup-Uretsky unitary X of 3.5 and the Spavins-Lande offset of 2.1 to obtain an X of 2.8. The target of 3.3 was then set by explicitly adding a 0.5 percent consumer productivity dividend (CPD) to the historical productivity offset to share the efficiency gains from the adoption of price cap regulation with customers: the LEC Price Cap Order observes that the FCC's

> "approach to establishing a reasonable offset has been in two stages. First, we have examined evidence and studies on historical telecommunications productivity, to establish an accurate productivity baseline, a level that LECs would be expected to achieve without regulatory reform. Second, we have proposed to add an additional productivity obligation, the Consumer Productivity Dividend or CPD, to assign the first price cap productivity gains to customers in the form of lower rates." (¶ 76).

Since the original CPD is already embedded in the current PCIs and since the industry is not now adopting incentive regulation for the first time, there is no additional productivity gain stemming from this price cap review that should be shared with customers. Thus the Commission's calculation from CC Docket No. 87-313--updated for current data-- would produce a productivity offset of 2.4 percent.